

Diseases of the Pharynx & Larynx

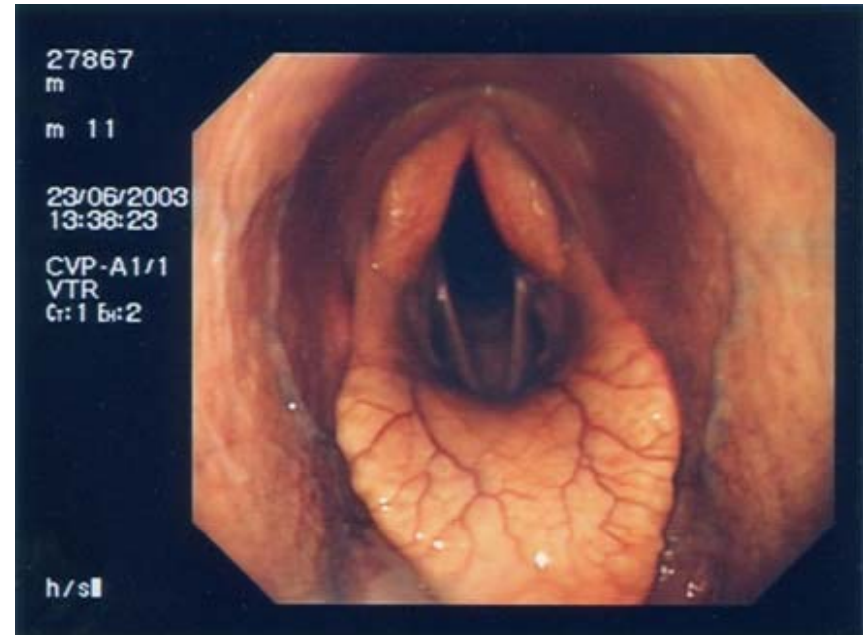
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NORMAL ANATOMY & PHYSIOLOGY: Pharynx

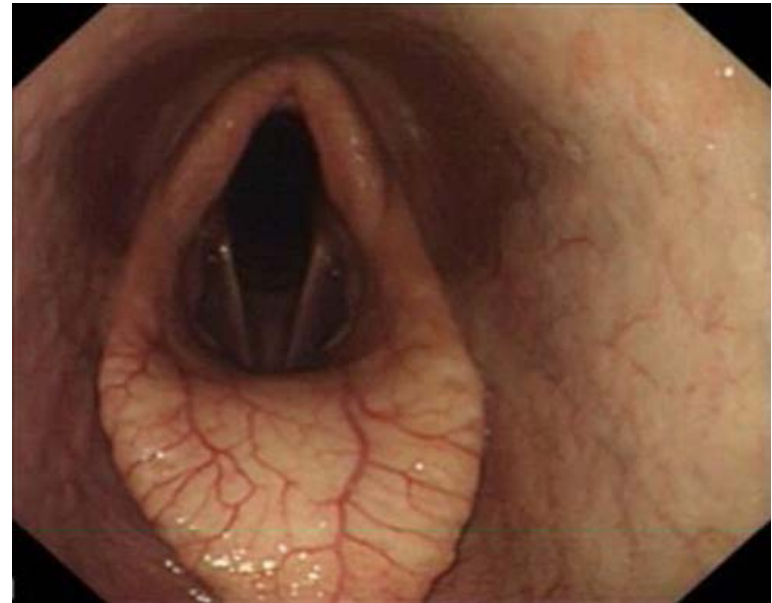
- Two main functions:
 - Delivers air from the nasal cavity to the larynx
 - Provides a pathway for food to be passed from the oral cavity to the oesophagus
- Nasopharynx and oropharynx separated by the soft palate
 - Obligate nasal breather
 - Larynx sits in the nasopharynx apart from during swallowing
- Pharynx lacks rigid support by bone / cartilage
 - Potential to collapse during exercise



NORMAL ANATOMY & PHYSIOLOGY: Larynx

Main functions:

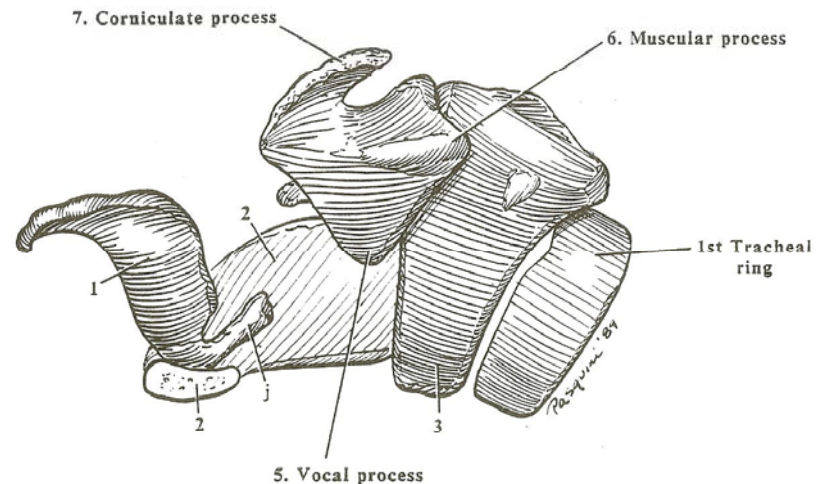
- Breathing
 - communication between pharynx & trachea
- Protect lower airway
 - prevent inhalation of food during swallowing
- Phonation / vocalisation



ABNORMAL ANATOMY & PHYSIOLOGY: Larynx

Larynx supported by a number of cartilages:

- **Cricoid** cartilage
 - ring shaped
- **Thyroid** cartilage
 - Largest of the cartilages
- **Epiglottis**
 - protection of the glottis
- **Paired arytenoid** cartilages
 - support the vocal folds
 - Muscular process
 - Corniculate process
 - Cuneiform process



NORMAL ANATOMY & PHYSIOLOGY: Larynx

- There are a number of intrinsic & extrinsic laryngeal muscles
- Contraction of the intrinsic laryngeal muscles changes the caliber of the rima glottidis
- **Ab**duction – opening of the glottis (exercise)
 - * the cricoarytenoideus dorsalis (CAD) muscle is the principle abductor
- **Ad**duction – closure of the glottis (swallowing)



APPROACH TO DIAGNOSIS

- HISTORY
 - Respiratory noise
 - Exercise intolerance / poor performance
- CLINICAL EXAMINATION
 - Palpation of the larynx
 - ‘Slap’ test
 - ‘grunt’ test



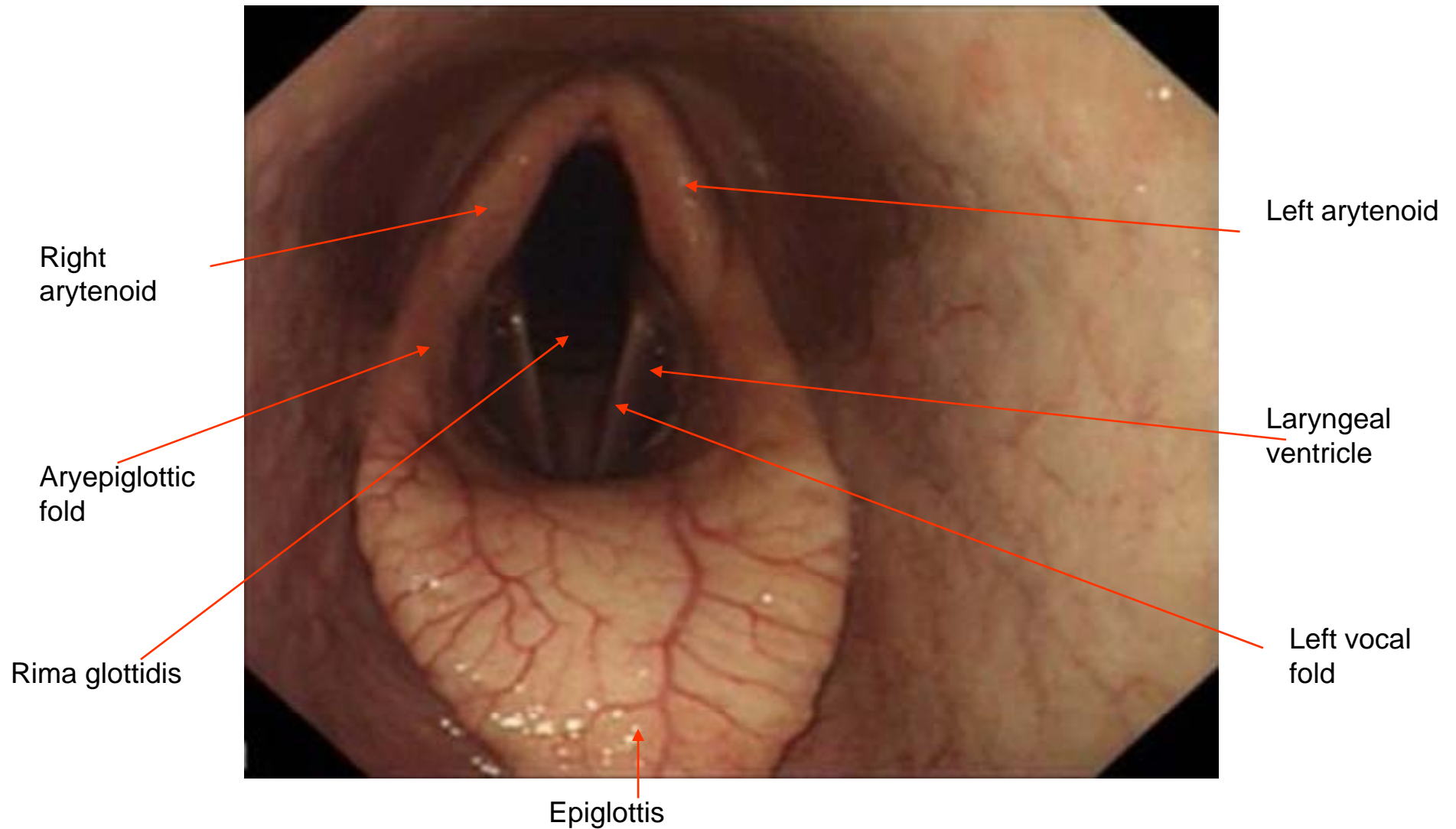
APPROACH TO DIAGNOSIS

ENDOSCOPY

- Most important imaging modality in the examination of the pharynx & larynx
- Done at rest / high-speed treadmill exercise
- Occasionally other imaging modalities employed
 - Radiography
 - Ultrasonography
 - Spectral sound analysis



Normal larynx & pharynx



LARYNGEAL & PHARYNGEAL DISORDERS

- Recurrent laryngeal neuropathy (RLN) and dorsal displacement of the soft palate (DDSP) are the two of the most common disorders
 - A variety of other disorders may occur
- Diagnosis is based on endoscopic examination
- Some conditions may only be seen at high speed
 - Diagnosis based on high-speed treadmill endoscopy
- Laser surgery has revolutionised the treatment of some of these conditions

LASER SURGERY

- Laser surgery is an important tool in treatment of disorders of the pharynx and larynx
 - Become increasingly used over the last 5 years
- Laser surgery can be performed transendoscopically under standing sedation (avoiding the need for GA) and does not involve an external incision
 - Minimally invasive surgical procedure
- Provides better access & visualisation compared to traditional surgical approaches

LASER SURGERY

- **LASER** stands for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation
- Energy is emitted from the laser in a form of light
- This energy can be used to cut & coagulate tissues
- Various types of laser (depending on the source from which the light is generated)
 - Most commonly used one in upper airway surgery is the diode laser



LASER SURGERY

- Horse is sedated and local anaesthetic applied to the larynx / pharynx
- Laser fibre passed down the biopsy channel of the endoscope
- Various levels of energy used depending on whether the tissues are to be cut or coagulated
- Eye protection essential



CONDITIONS OF THE PHARYNX

DORSAL DISPLACEMENT OF THE SOFT PALATE (DDSP)

- Common condition in racehorses (approx 10-20% of 2 & 3 year old horses)
- Dynamic condition that occurs during intense exercise
 - Aetiology unknown ?mechanical
- Occasionally permanent DDSP occurs causing dysphagia (e.g. guttural pouch mycosis)
- Soft palate displaces dorsally resulting in an expiratory obstruction

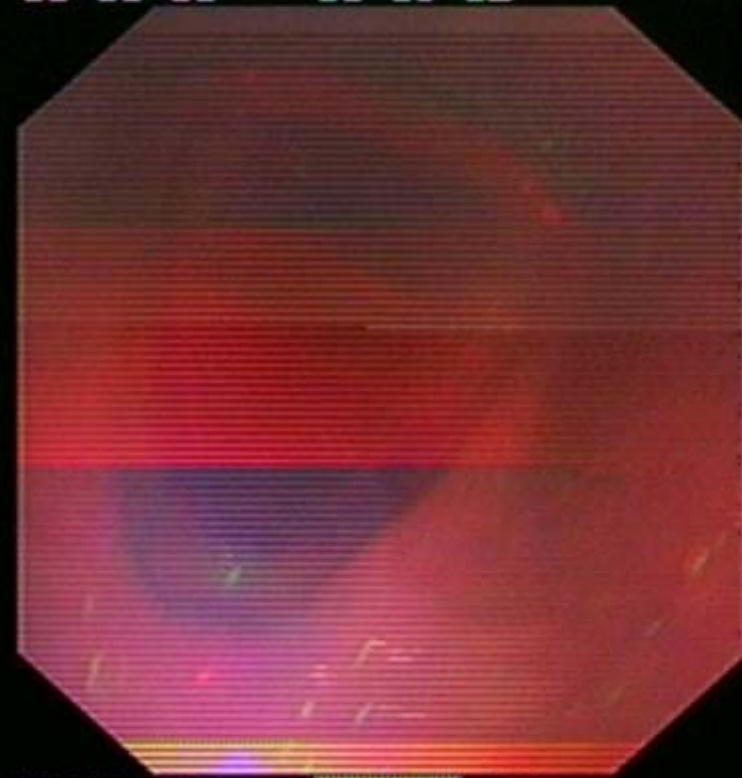
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DDSP: DIAGNOSIS

- History
 - Exercise intolerance
 - Gurgling / vibrating noise
 - Rider reports 'choking down / up' / 'swallowing its tongue'
- Endoscopy
 - Intermittent displacement of the soft palate most common
 - Epiglottis cannot be seen
 - Can see the caudal free borders of the soft palate
 - May only be seen on treadmill endoscopy/ when the head is flexed

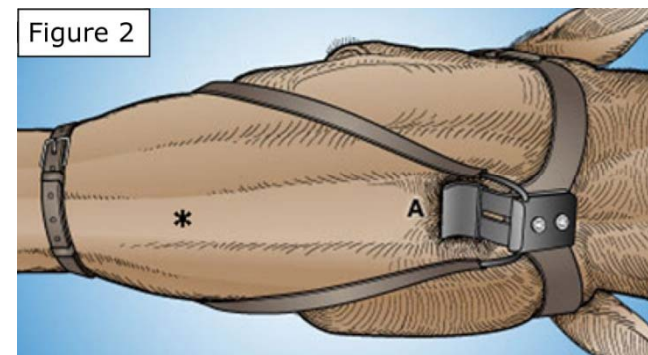


DDSP: TREATMENT

- Numerous!
- Conservative or surgical treatment
- 60-70% success rate

Conservative treatment:

- Get horses fit
- Change tack- change noseband / bit
- Treat inflammatory conditions of the pharynx / guttural pouch
- Try throat support device?



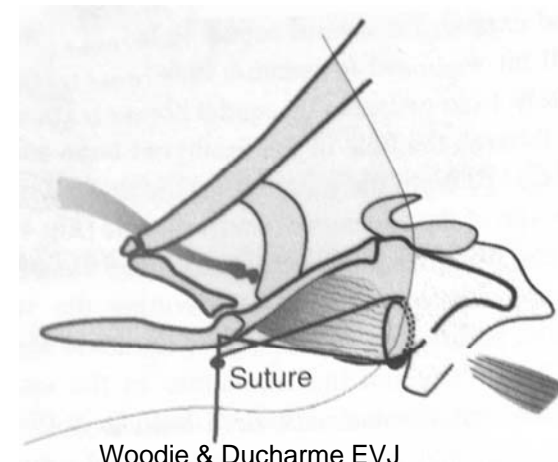
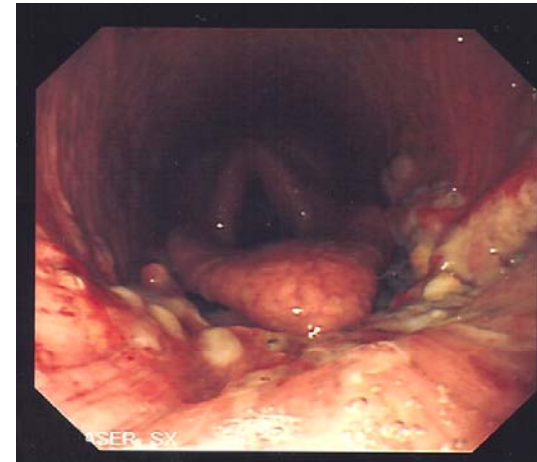
DDSP: TREATMENT

SURGICAL TREATMENT

- Indicated if medical treatment & other conservative treatments have failed
- Controversial
- Equine surgeons disagree on the treatment of choice – no one method seems to be the best
- Success rates for any procedure / combination of procedures around 60-70%!

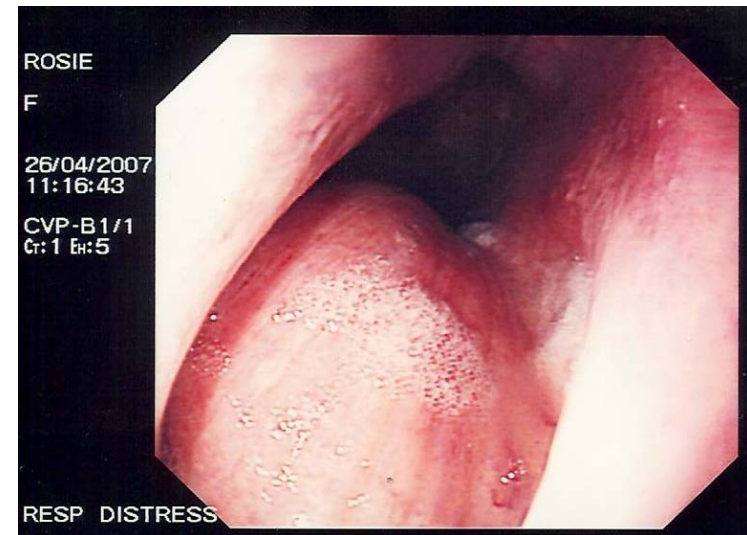
DDSP: SURGICAL TREATMENT OPTIONS

- **STAPHYLECTOMY**
 - Partial soft palate resection
 - ?excessively long soft palate
- **MYECTOMY**
 - Removal of some of the extrinsic muscles of the larynx
 - Reduces caudal retraction of larynx
- **INDUCTION OF PALATAL FIBROSIS**
 - Thermal / laser cautery
 - Palatoplasty
 - Stiffens soft palate
- **TIE FORWARD**
 - Sutures placed between basihyoid bone & thyroid cartilage
 - Positions the larynx more rostral & dorsal



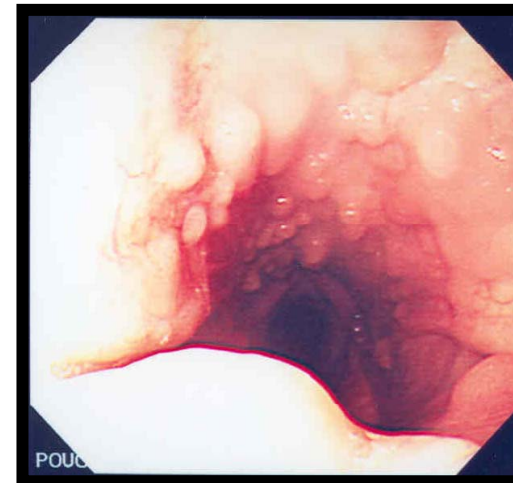
NASOPHARYNGEAL COLLAPSE

- Dynamic obstruction at exercise (occasionally severe enough to cause clinical signs at rest)
- Causes inspiratory upper respiratory noise
- Aetiology unknown
 - neurological cause?
- **Diagnosis:** endoscopy (usually treadmill endoscopy required unless obvious signs at rest)
- **Treatment:** limited
 - Can try thermal / laser palatoplasty



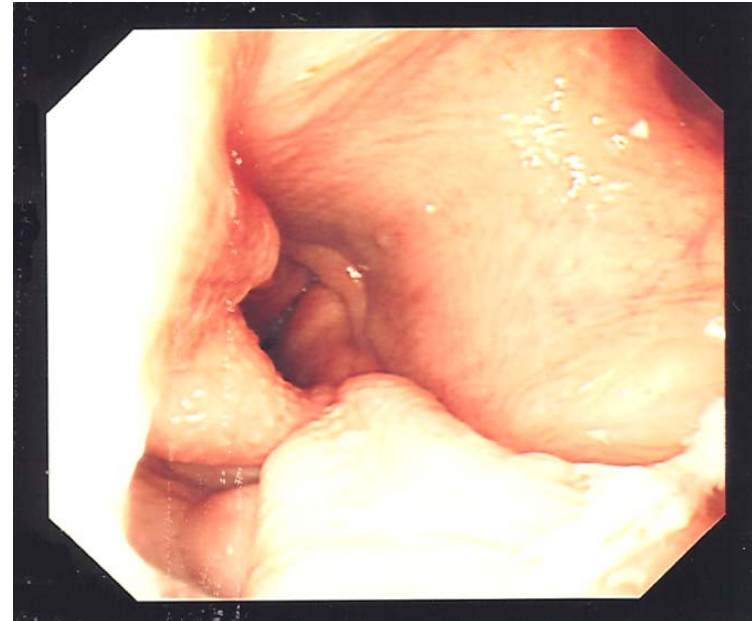
PHARYNGEAL LYMPHOID HYPERPLASIA (pharyngitis)

- Very common in young horses
 - Response to new stimuli – allergens, bacteria & viruses
- In severe cases can cause clinical signs of exercise intolerance
- **Diagnosis:** endoscopy
 - Scoring system grade 1-4
- **Treatment:**
 - Usually self limiting
 - Occasionally anti-inflammatories (NSAIDs, inhaled / systemic steroids +/- antibiotics / antivirals if indicated)



CLEFT PALATE

- Rare
- Congenital abnormality
 - ? Genetic mutation / toxins / medications affecting fusion of palatine process
- Soft +/- hard palate involved
- **Clinical signs:**
 - Nasal discharge of milk
 - Coughing when nursing
- **Diagnosis:**
 - Clinical signs
 - Endoscopy
- **Treatment:**
 - Euthanasia
 - Surgery – difficult access, rarely performed



LARYNGEAL DISORDERS

RECURRENT LARYNGEAL NEUROPATHY (RLN)

- Common
- Unilateral paralysis of the left arytenoid cartilage
- Cause unknown (hence also known as idiopathic laryngeal hemiplegia)
 - Likely genetic aetiology
- Progressive loss of large myelinated nerve fibres in the left recurrent laryngeal nerve
- Progressive neurogenic atrophy of intrinsic laryngeal muscles *CAD muscle
- Loss of ab- and adductor function

RLN: DIAGNOSIS

- Occurs in horses from a few months of age – 10 years old
- Most commonly affects large breeds
- History:
 - Abnormal inspiratory noise at exercise
- Clinical examination:
 - +/- atrophy of CAD
 - -ve slap test

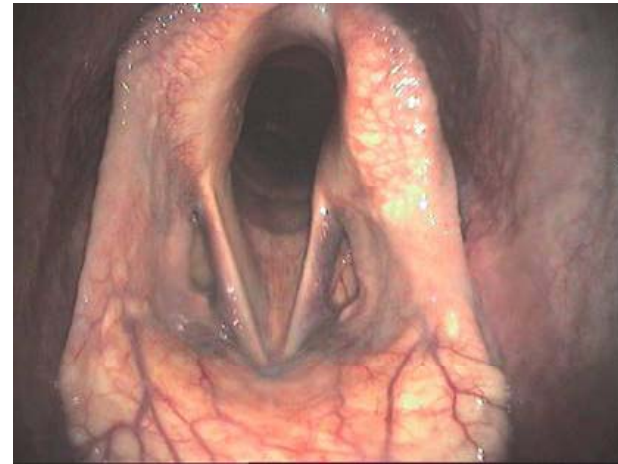


RLN: DIAGNOSIS

ENDOSCOPY

- Look for asymmetry & asynchronous movement of the arytenoid cartilages
- Various grading schemes
 - **Grade I**
 - Arytenoids symmetrical & asynchronous
 - Complete abduction can be maintained
 - **Grade II**
 - Larynx asymmetric / asynchronous movement
 - Full abduction can be achieved & maintained
 - Subdivided into IIa and IIb
 - **Grade III**
 - Asynchrony +/- asymmetry of arytenoids
 - Full abduction cannot be achieved & maintained
 - Subdivided into IIIa, IIIb, IIIc
 - **Grade IV**
 - Arytenoid cartilage & vocal fold immobile

GRADING OF LARYNGEAL MOVEMENT



RLN: TREATMENT

- Depends on use / intended of horse and degree of laryngeal paralysis
 - Reduce noise
 - Reduce exercise intolerance
- **Ventriculectomy / Ventriculocordectomy**
- **Laryngoplasty**
- **(Neuromuscular pedicle graft)**
 - Option in young horses
 - Reinnervation of CAD
- **(Arytenoidectomy)**
 - Salvage procedure

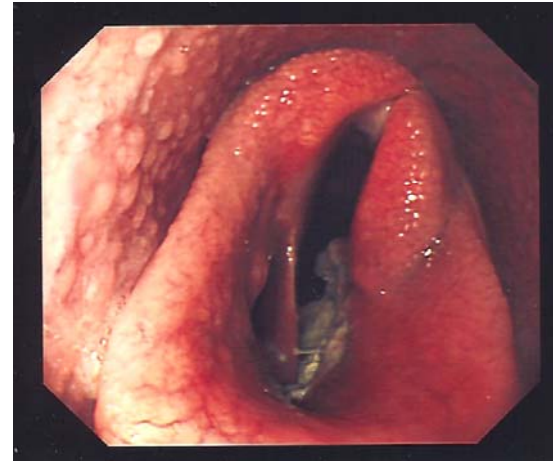
TRADITIONAL VENTRICULECTOMY / VENTRICULOCORDECTOMY

- ‘Hobday’ procedure
- Performed via a laryngotomy under GA
- Roaring burr used to evert left or both ventricles
- Ventricle then excised
- +/- vocal cord removed at the same time



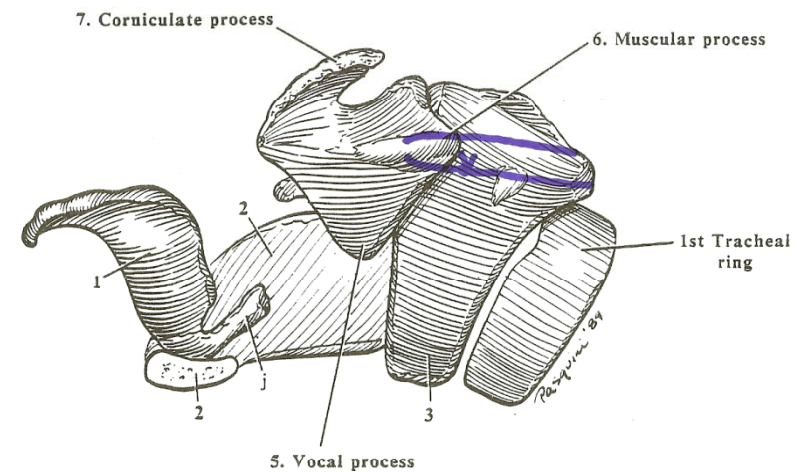
LASER VENTRICULECTOMY / VENTRICULOCORDECTOMY

- Increasingly performed over the last 5 years
- Can be done in the standing sedated horse
- Lasering of ventricle to induce fibrosis
- Alternatively, ventricle is everted and excised / vocal cord removed



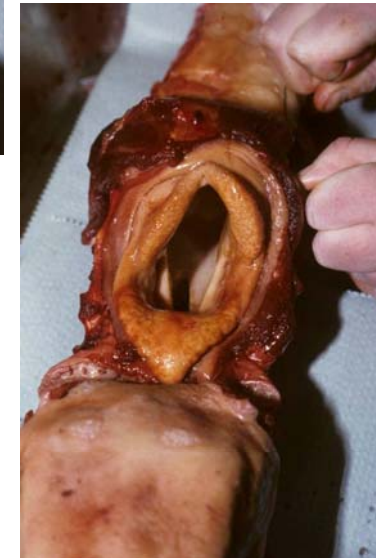
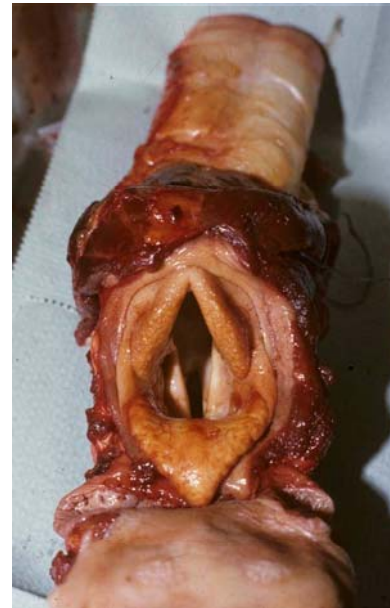
PROSTHETIC LARYNGOPLASTY (‘Tie-back’)

- Suture placed between
 - Dorsocaudal edge of cricoid cartilage
 - Muscular process of left arytenoid cartilage
- Mimics the action of CAD
- Permanent abduction of left arytenoid cartilage



PROSTHETIC LARYNGOPLASTY

- Difficult surgery – access difficult & correct placement of suture critical
 - Various prostheses used including braided polyester, nylon and wire
- Post-operative complications
 - Cough = common, usually short term
 - Loss of arytenoid abduction – common, depends in the degree of loss
 - Incisional infection / infection of prosthesis

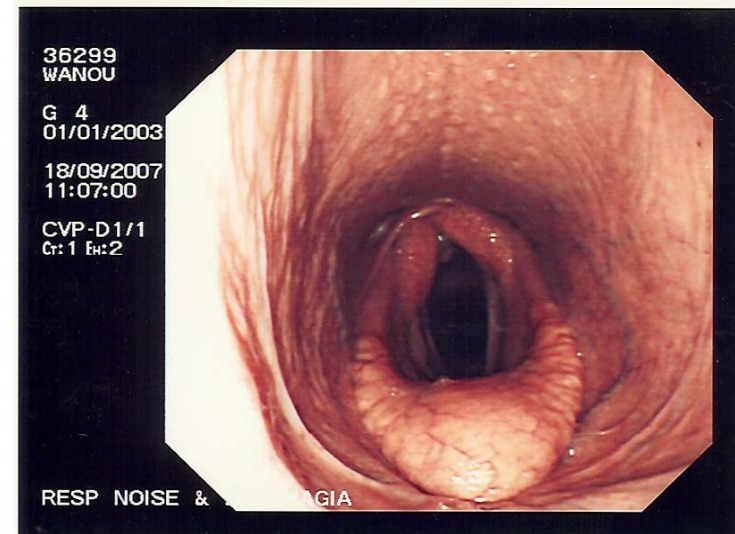


OTHER CAUSES OF LARYNGEAL PARALYSIS

- Unilateral (left or right) and bilateral paralysis can occur
- Bilateral cases present with severe dyspnoea & may require emergency tracheotomy
- Causes:
 - Peripheral neuropathy e.g. liver disease
 - Guttural pouch disease
 - Organophosphate poisoning
 - Injection of irritant drugs (jugular vein missed)
 - Other CNS / neck disease
 - Post-anaesthetic laryngeal paralysis

4TH BRANCHIAL ARCH DEFECTS

- Uncommon
- Congenital aplasia / hypoplasia of cartilaginous & muscular structures derived from 4th Branchial arch
- Causes right sided hemiplegia (occasionally left)
- Clinical signs:
 - Abnormal respiratory noise at exercise
 - Incompetance of upper oesophageal sphincter
- Diagnosis:
 - Palpation
 - Endoscopy



EPIGLOTTIC ENTRAPMENT

- Common in racehorses
- Loose mucous membrane normally located on the ventral surface of the epiglottis becomes displaced dorsally
- **Clinical signs:**
 - Exercise intolerance
 - Abnormal respiratory noise
- **Diagnosis:**
 - Endoscopy
- **Treatment:**
 - Resection of entrapping membrane by laser surgery
 - Transnasal / transoral division of membrane using curved bistoury knife



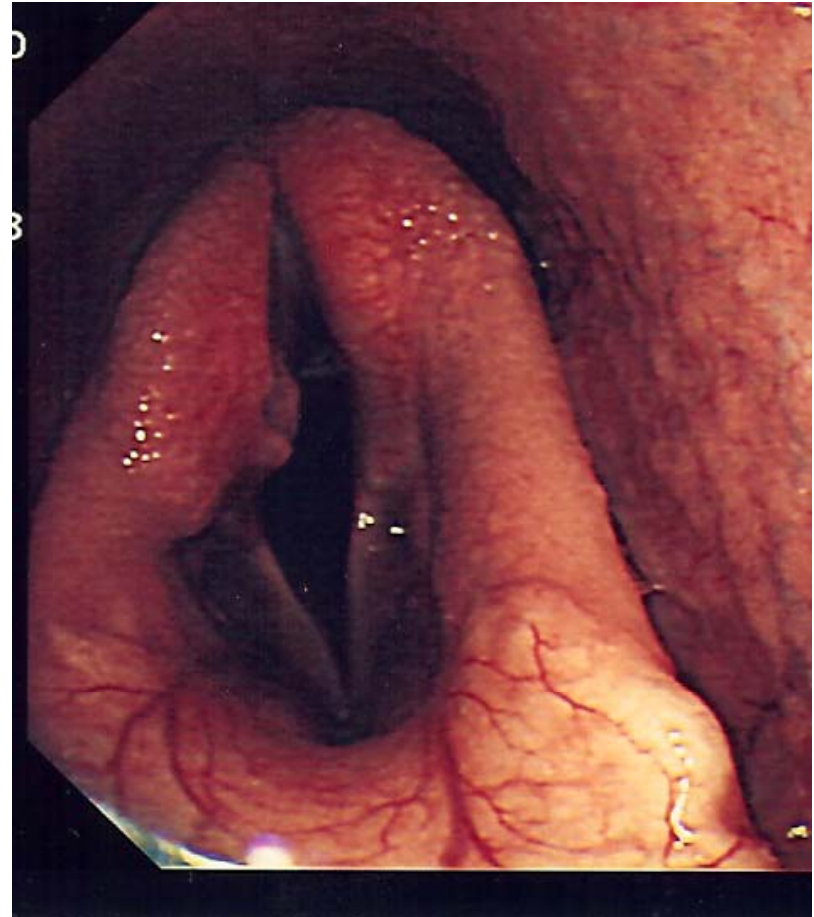
SUB-EPIGLOTTIC CYST

- Seen in young horses ?congenital abnormality
- **Clinical signs:**
 - Respiratory noise
 - Coughing
 - +/- dysphagia, inhalational pneumonia
- **Diagnosis:**
 - Endoscopy
 - Radiography
- **Treatment:**
 - Removal of cyst using laser / conventional surgery



ARYTENOID CHONDRITIS

- Progressive inflammation and swelling of the arytenoid cartilage
- Uncommon in the UK; more common in USA
- **Clinical signs:**
 - Abnormal respiratory noise at exercise
 - Exercise intolerance
- **Diagnosis:**
 - Endoscopy
- **Treatment:**
 - Medical therapy if mild
 - Arytenoidectomy in severe cases



AXIAL DEVIATION ARYEPIGLOTTIC FOLDS

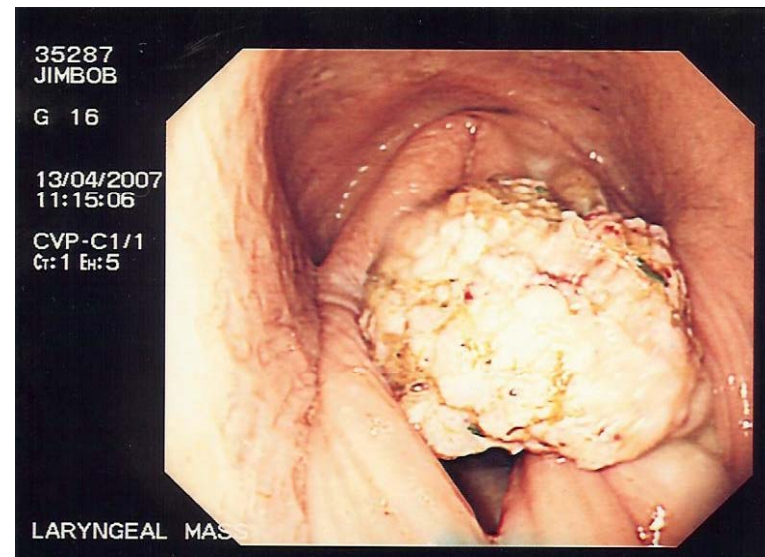
- Not diagnosed until the advent of high-speed treadmill endoscopy
- Occurs during maximal exertion
- Dynamic upper respiratory tract obstruction
- **Diagnosis:** treadmill endoscopy
- **Treatment:** resection of portion of fold by laser (or conventional surgery)





OTHER LESS COMMON DISORDERS OF THE LARYNX

- Epiglottic retroversion
- Hypoplasia / deformity of epiglottis
- Epiglottitis / epiglottic abscess
- Subepiglottic granuloma
- Neoplasia



SUMMARY

- Disorders of the larynx & pharynx are common
- Particularly important in the performance horse
- Laser surgery has revolutionised treatment options for some disorders of the larynx and pharynx
- The optimal treatment for DDSP remains controversial
- RLN is common and is treated by ventriculectomy (+/- cordectomy) and laryngoplasty